Center Innovation Fund: SSC CIF

Augmented Control of Rocket Diffuser Boundary Layer Separation

Completed Technology Project (2015 - 2016)

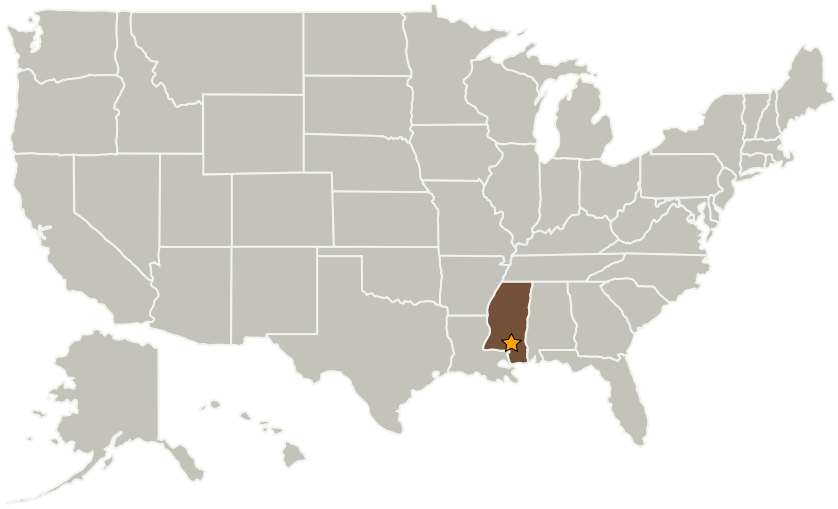
Project Introduction

Evaluate the feasibility of the following active and passive methods of boundary layer control using Computational Fluid Dynamics: 1) Reduce the adverse pressure gradient along the wall by allowing separated flow to feed back upstream into the diffuser (passive); 2) Create a miniature annular ejector within the diffuser to create a favorable pressure gradient and entrain the primary plume (active); 3) Increase boundary layer momentum using secondary flow injection parallel to the primary flow (active); 4) Any combination of the above, or other control schemes not yet identified. Once candidate control strategies have been identified using CFD methodologies, they will be verified empirically in the NCPA wind tunnel.

Anticipated Benefits

Potential advances in boundary layer control techniques would primarily benefit jet and rocket propulsion test facilities but could also be applied to supersonic wind tunnels.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Stennis Space Center(SSC)	Lead Organization	NASA Center	Stennis Space Center, Mississippi

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Primary U.S. Work Locations
Mississippi

Project Website:

https://www.nasa.gov/directorates/spacetech/home/index.html

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Stennis Space Center (SSC)

Responsible Program:

Center Innovation Fund: SSC CIF

Project Management

Program Director:

Michael R Lapointe

Program Manager:

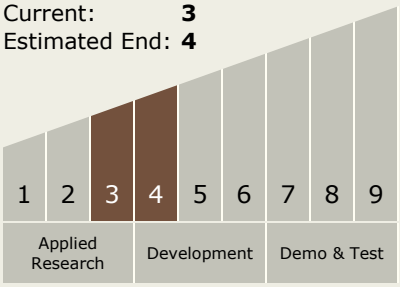
Ramona E Travis

Principal Investigator:

Daniel C Allgood

Technology Maturity (TRL)

Start: **3**
Current: **3**
Estimated End: **4**



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Technology Areas

Primary:

- TX15 Flight Vehicle Systems
  - TX15.1 Aerosciences
    - TX15.1.5 Propulsion Flowpath and Interactions

Target Destination

Earth